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ABSTRACT

This paper reports on a survey instrument designed to measure opinions regarding computer knowledge and usage among high school teachers of mathematics (N=66) and college faculty of mathematics (N=25). Findings indicate that the college faculty made reference to computer usage more often in their lectures than did the high school teachers. Additionally, the college faculty estimated their knowledge of computers higher than did the high school teachers, but evaluated their students' knowledge as lower than the evaluation given by the high school teachers. Finally, both the high school teachers and the college faculty agreed that they rarely used the Internet in the classroom, but both groups said they anticipated more usage in the future. The survey instrument is also included. (Author/JRH)

Computer Usage Among High School Teachers of Mathematics and College Mathematics Faculty

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Abstract

A survey instrument designed to measure opinions regarding computer knowledge and usage among high school teachers of mathematics and college faculty of mathematics was developed by the authors. The survey was distributed to thirty randomly-selected high school districts and thirteen colleges, all located in Long Island, New York. The final sample consisted of 66 high school mathematics teachers and 25 college faculty of mathematics. The college faculty made reference to computer usage more often in their lectures than did the high school teachers. Additionally, the college faculty estimated their knowledge of computers higher than did the high school teachers, but evaluated their students' knowledge as lower than the evaluation given by the teachers. Finally, both the high school teachers and college faculty agreed that they rarely used the Internet in the classroom, but both groups said they anticipated more usage in the future. The survey instrument is included.

Introduction

It's been estimated by the Office of Technology Assessment (1995) that the number of computers in K-12 schools will be 5.8 million during 1995, one for every nine students. Despite this low ratio, it has been shown by a number of studies that the majority of K-12 teachers are not fully utilizing the new technologies (Hunt & Bohlin, 1995). Lack of training has been cited as one reason, that has caused K-12 teachers to feel inadequately prepared to use computers in the classrooom (Topp, Mortensen & Grandgenett, 1995).

The purpose of the current study is to determine how high school mathematics teachers and college faculty of mathematics rate their knowledge of computers. To that end, a survey instrument was developed using seven-point Likert-type scales. The questions asked if the respondent used knowledge of computer technology in their classes as well as questions concerning their own knowledge of computers and how they viewed their students' knowledge of computer technology.

The Sample

In Nassau County, Long Island, New York, there are approximately sixty high school districts. From these districts, thirty districts were randomly selected. Cover letters and five survey instruments were mailed, with postage-paid return envelopes included, to the mathematics chair of each high school. The letter asked the chair to distribute the surveys randomly to the first five teachers he/she encountered from the mathematics department during the day. Of the 150 surveys mailed out, 66 were returned.

Of the 44% returned, the sample included 31 male mathematics teachers and 34 female mathematics teachers (1 respondent did not answer the gender question). Over 50% of the respondents indicated that they had twenty years or more teaching experience.

The college sample was derived from a mailing to thirteen colleges located in

Nassau, Suffolk, or Queens Counties, all of which are geographically located in Long Island, New York. Each college chair was mailed a cover letter and five survey instruments. Of the 65 surveys mailed out, 25 were returned (response rate of 38%).

The college faculty sample contained responses from 17 male mathematics college faculty and 8 female mathematics college faculty. Similar to the high school respondents, over 50% of the college faculty indicated having over twenty years teaching experience.

Results

The respondents were asked to indicate, on a seven-point scale, how often they made reference to computer technology and software in their lectures. A score of four was indicative of sometimes referencing computer usage in their lessons. Above a four indicated more than passing interest in computer usage included in class lectures. On this question, only 30% of the high school teachers answered with a five or better, whereas a full 60% of the college faculty so indicated ($Z= 2.65$, $p<.01$). The college mathematics faculty are referencing computer usage in their lectures more often than the high school mathematics teachers.

Not surprisingly, when the respondents were asked to estimate the amount of their own knowledge and expertise concerning computers, the high school teachers chose a score of five or more (considerable knowledge) only 41% of the time, whereas the college faculty graded themselves at this level 72% of the time ($Z= 2.86$, $p<.01$).

When asked to estimate the amount of knowledge of computers for their students, the high school teachers rated the student's knowledge, higher on average, than the college faculty (although not significantly). Perhaps the college faculty, ranking their own knowledge of computers higher than the teachers did, are more demanding and thus, rank the student's knowledge lower than the teachers do. The respondents were also asked for their opinion as to what percentage of their students have computers at home. A full 85% of the high school teachers felt that at

least half their students had computers at home, whereas only 55% of the college faculty felt that way ($Z= 2.76$, $p<.01$).

On other questions there tended to be general agreement between the high school teachers and the college faculty. When asked about using the Internet in the classroom, 60% of the teachers and 44% of the college faculty indicated no use at all. This, in spite of the fact that all the colleges and most of the high schools are fully wired for the Internet and have computer labs with the Internet widely available to the students. Both groups did agree that they expect to use more of the Internet in their lectures in the future (82% of the teachers and 80% of the college faculty).

Discussion

Consistent with studies indicating that high school teachers tended to be poorly trained in the use of computer technology, this study has shown that they have rated their own knowledge of computer technology significantly lower than the self-rating of knowledge given by college mathematics faculty. The college faculty have also indicated that they refer to computers and utilize computer technology more often than their couterparts on the high school level. Interestingly, the college faculty have indicated that the percentage of their students with computers at home is less than what the high school teachers indicated.

The fact that there was an equal return among male and female high school teachers, but fewer females on the college faculty, is consistent with national findings that show females being clustered in K-12 with regard to mathematics teaching.

References

Office of Technology Assessment, U.S. Congress, (1995). Teachers & technology: Making the connection. OTA report summary. Washington, D.C.: U.S. Government Printing Office.

Topp, N.W., Mortensen, R., & Grandgenett, N. (1995). Building a technology--using faculty to facilitate technology-using teachers. Journal of Computing in Teacher Education, 11(3), 11-14. SP 524 325.

Computer Usage Survey
College Teachers

The following survey is designed to determine the extent to which computers and/or calculators are being used in education. Surveys are to be completed anonymously. Please do not indicate your name or school anywhere on the survey. Thank you for your cooperation.

Demographics:

1. Please indicate how long you have been a teacher.

_____	_____	_____	_____	_____	_____
New	1-5 years	6-10 years	11-15 years	16-20 years	20+ years

2. Your Gender: _____ Male _____ Female

3. The subject you teach.
   - English_____
   - Mathematics_____
   - Science_____
   - History_____
   - Foreign Language _____
   - Computers _____
   - Business _____
   - Other (please specify) _____

4. Do you ***principally*** teach _____ Undergraduate _____ Graduate

Computer/Calculator Usage:

5. During the academic semester, how often do you make reference to computer technology, computer software, etc. in your teaching/class lectures?

1	2	3	4	5	6	7
Never	Seldom		Sometimes		A Lot	All the time

6. During the academic semester, how often do you incorporate the use of a **computer** in the classroom (including assignments for a computer lab)?

1	2	3	4	5	6	7
Never	Seldom		Sometimes		A Lot	All the time

7. During the academic semester, how often do you use and/or refer to the use of a **calculator** in your teaching?

1	2	3	4	5	6	7
Never	Seldom		Sometimes		A Lot	All the time

** If you use a calculator in the classroom, please indicate which one.

_____

8. Have you ever completed a course, seminar, etc. in the use of computer and/or calculator technology in the classroom?

Yes	No

9. Estimate the amount of ***your*** knowledge concerning computers.

1	2	3	4	5	6	7
None	Little		Some		A Lot	Extensive

10. Estimate the average number of hours per week that **you** spend on a computer, preparing lessons, doing research, etc.

0	1-2	3-4	5-6	7-8	9-10	11+

11. Is your work on the computer departmentally or team-focused or do you work individually on the computer preparing lessons?

Departmental	Individually	Do Not Use for lessons

12. Estimate the ***average*** amount of knowledge concerning computers of your students.

1	2	3	4	5	6	7
None	Little		Some		A Lot	Extensive

13. Estimate the percentage of your **students** who have computers in their home.

1	2	3	4	5	6
None	below 20%	30%	50%	70%	Above 80%

14. Do you incorporate information from the Internet in your class lessons?

1	2	3	4	5	6	7
None	Little		Some		A Lot	Extensive

15. Looking ahead to the next few years, how much ***more*** do you anticipate relying on computer software and/or Internet access in your teaching lessons?

1	2	3	4	5	6	7
No More	Little		Some		A Lot	Extensive

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